Title: Can ultraviolet (UV) bronchoscopy detect lung cancers? A prototype study

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Body: The clinical utility of fluorescence blue light bronchoscopy for detection of early stage lung cancers is limited by low specificity. The aim of this prototype study is to determine whether ultraviolet autofluorescence bronchoscopy can differentiate between normal and malignant tissue along a histological gradient. A monocentre interventional prospective study called UVFBCL (Grant: Eurimus UVE EM 98) recruited 30 patients referred for rigid bronchoscopy for malignant (histologically proven) bronchial obstruction. Standard white light imaging was used to identify for each patient, a macroscopically normal, suspicious and malignant zone. The prototype telescope acquired greyscale images under UV light for each of the zones. The average greyscale density was measured and this is inversely proportional to the ratio of fluorescence Rd at 360 nm (Tryptophane emission) versus 450 nm (NADH emission). Biopsies were carried out in each of the zones and in the event of discrepancy a re-classification was performed according to the histological findings. Two of the 30 patients were excluded. In 3 cases, normal zones were not found and in 2 cases, UV images cannot be recorded in suspicious zone. In all but one case (who had a small cell lung cancer) the ratio Rd decreases along the gradient of histological abnormality from normal to malignant. With an adequate threshold (42) the sensitivity for cancer detection is upper than 92% and the specificity (in intention to diagnose) is 79%. The accuracy is 89%. Ultraviolet autofluorescence bronchoscopy shows good differentiation between normal, suspicious and malignant tissue and highlights a potential future role in the detection of pre-invasive lung malignancy.